U.S. GOVERNMENT ACCOUNTABILITY OFFICE
441 G St. N.W.
Washington, DC 20548

March 14, 2014

Congressional Addressees

Regional Missile Defense: DOD's Report Provided Limited Information; Assessment of Acquisition Risks is Optimistic

In response to changing threats in the region and new opportunities created by advances in missile defense technology, in September 2009 the President announced a new policy for ballistic missile defense of Europe, called the European Phased Adaptive Approach (EPAA). EPAA is designed to rely on increasingly capable missiles, sensors, and command and control systems to defend Europe against threat missiles of various ranges. In its February 2010 Ballistic Missile Defense Review, DOD presented EPAA as part of a broader policy for regional ballistic missile defense, to also include phased adaptive approaches for other regions such as East Asia and the Middle East. DOD's Missile Defense Agency (MDA) is developing and integrating capabilities that will be part of EPAA. U.S. Strategic Command works with the military services and regional combatant commands—such as U.S. European Command for EPAA—to determine whether to accept those capabilities. We have issued reports in 2010, 2011, 2012, and 2013 containing assessments of EPAA.[1]

The National Defense Authorization Act for Fiscal Year 2013 (NDAA) mandated that the Secretary of Defense submit to the congressional defense committees a report describing the status and progress of regional missile defense programs and efforts (including EPAA) and required DOD to include certain topics:[2]

- *Assessment of the adequacy of the existing and planned European Phased Adaptive Approach to provide force protection for forward-deployed forces of the United States in Europe against ballistic missile threats from Iran, and an assessment whether adequate force protection would be available absent the European Phased Adaptive Approach, given current and planned Patriot, Terminal High Altitude Area Defense, and Aegis ballistic missile defense capability.*
- *Description of the progress made in the development and testing of elements of systems intended for deployment in Phases 2 through 4 of the European Phased Adaptive Approach, and an assessment of technical and schedule risks.*
- *Description of the missile defense priorities and capability needs of the regional combatant commands, and the planned regional missile defense architectures derived from those capability needs and priorities.*

[1] GAO, *Missile Defense: Opportunity to Refocus on Strengthening Acquisition Management,* GAO-13-432 (Washington, D.C.: Apr. 26, 2013); GAO, *Missile Defense: Opportunity Exists to Strengthen Acquisitions by Reducing Concurrency,* GAO-12-486 (Washington, D.C.: Apr. 20, 2012); GAO, *Missile Defense: Actions Needed to Improve Transparency and Accountability,* GAO-11-372 (Washington, D.C.: Mar. 24, 2011); GAO, *Ballistic Missile Defense: DOD Needs to Address Planning and Implementation Challenges for Future Capabilities in Europe,* GAO-11-220 (Washington, D.C.: Jan. 26, 2011); GAO, *Missile Defense: European Phased Adaptive Approach Acquisitions Face Synchronization, Transparency, and Accountability Challenges,* GAO-11-179R (Washington, D.C.: Dec. 21, 2010).

[2] Pub. L. No. 112-239, § 229.

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- *Description of the global force management process used to evaluate the missile defense capability needs of the regional combatant commands and to determine the resource allocation and deployment outcomes among such commands.*
- *Description of the missile defense command and control concepts and arrangements in place for United States and allied regional missile defense forces, and the missile defense partnerships and burden-sharing arrangements in place between the United States and its allies and partners*.

The NDAA also required us to both provide our views on DOD's report and to submit a report to the congressional defense committees as soon as practicable. As such we assessed: (1) the extent to which DOD's Regional Ballistic Missile Defense Report addressed the topics in Section 229 and (2) acquisition risks, if any, that could affect the planned delivery of capability for the U.S. ballistic missile defense of Europe. We provided a briefing on our results to the congressional defense committee staff on December 16, 2013.This letter meets the reporting requirement by formally transmitting that briefing (see Enclosure I).[3]

To assess DOD's report, we compared it to section 229 of the NDAA and to information gathered about regional ballistic missile defense efforts as part of an ongoing review of EPAA. We met with DOD officials to discuss DOD's report methodology and met with other DOD officials to discuss their input. We focused our review on the form and substance of the material in DOD's report and did not assess its compliance with the law.

To assess acquisition risks to the planned delivery of capability for EPAA we reviewed the President's EPAA policy, DOD directives and instructions related to missile defense, analyzed MDA's systems engineering Master Integration Plans, Integrated Master Test Plans, Integrated Master Assessment Plans, and Program Execution and Baseline Execution Reviews and other documentation containing plans and accomplishments related to implementing acquisitions for EPAA. We compared the documents issued in 2010 to those same documents issued in 2011, 2012, and 2013 to identify capability delays and risks. We met with MDA and DOD officials to clarify and corroborate that material.[4]

We conducted this performance audit from October 2012 to March 2014 in accordance with generally accepted government auditing standards. This timeframe includes work we already had underway on EPAA. Government auditing standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Summary

We found that DOD's Regional Ballistic Missile Defense report contained information pertaining to all five topics, generally describing plans and processes for regional missile defense;

[3] In 2012, the Chairman, House Armed Services Subcommittee on Strategic Forces, asked us to review a number of related acquisition issues concerning EPAA. Thus, our December 2013 congressional defense committee briefing and this report address both that earlier request and the subsequent NDAA mandate.

[4] In our briefing we noted that an integrated investment view of EPAA was not present. On February 25, 2014, in response to a 2011 congressional request, the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics submitted to the requestors a summary of life-cycle costs for EPAA prepared by its Office of Cost Assessment and Program Evaluation. As this was the same day DOD provided us comments on our draft report, although it is possible this could change our assessment, we did not have time to determine whether an update was appropriate.

however, for four topics, DOD has more comprehensive information which it could have provided to better reflect its current efforts and activities. As to the remaining topic—a description of progress in system development and testing for EPAA and an assessment of technical and schedule risk—the report characterizes technical and schedule risks as being minimized. Based on our body of work over several years, we see the report's characterization of these acquisition-related risks as optimistic. Specifically, since our first review of EPAA in 2010, we found that DOD has progressed in establishing some acquisition management practices for EPAA and it has delivered some capabilities; however, while the dates have not changed for declaring when technical capabilities for EPAA are delivered, technical and schedule delays have reduced both the capability MDA plans to deliver and the understanding of how that capability will perform.[5]

We see three challenges DOD faces in its acquisition approach for EPAA: (1) fully implementing a management process that synchronizes acquisition activities and ensures transparency and accountability; (2) improving execution of development and integration plans to stem fragmentation of development activities, schedule delays, and concurrency between key events; and (3) executing plans for tests and assessments so that these activities can be completed before MDA declares that a technical capability has been delivered. Until these challenges are met, technical, schedule, and other risks will remain.

We therefore concluded that, while DOD's Regional Ballistic Missile Defense Report provides general information, DOD had additional details it could have provided which would benefit the congressional defense committees during their authorization and appropriation deliberations.[6] We also concluded that MDA's decision to delay delivery of some capabilities for EPAA as compared to initial plans and make subsequent upgrades after EPAA phase declarations reflects the complexity of developing and integrating systems that provide an increasingly capable defense of Europe. While this approach allows flexibility, it does so at the risk of delivering less capability than expected without demonstrating the actual performance of what is delivered.

We are not making any recommendations in this report. We previously made recommendations related to EPAA:

- In 2011 we recommended that DOD establish an integrated schedule and develop life-cycle cost estimates for EPAA.[7]

- In 2012 we recommended that DOD assess the extent to which the dates announced by the President in 2009 are contributing to concurrency and recommend schedule adjustments where significant benefits can be obtained.[8]

Based on DOD's response to those recommendations and subsequent follow-up, we do not expect them to be fully implemented. However, we continue to believe implementing these

[5] GAO-11-179R.

[6] After our December 16, 2013 briefing, the National Defense Authorization Act for Fiscal Year 2014, Pub. L. No. 113-66 (2013) was enacted. Section 233(b) contains a requirement for DOD to again report on Regional Ballistic Missile Defense.

[7] GAO-11-220.

[8] GAO-12-486.

recommendations is important to improve transparency and accountability of acquisitions for EPAA, especially given the EPAA policy's commitment to deploy capabilities that are proven and cost-effective, and the Ballistic Missile Defense Review's commitment that new capabilities must be fiscally sustainable over the long term.

Agency Comments and Our Evaluation

In commenting on our draft report (reproduced in Enclosure II), DOD noted that the Department had previously provided technical comments on the enclosed briefing, of which a majority were still applicable. Regarding our views on DOD's Regional Ballistic Missile Defense report itself, several of the technical comments relate to information that DOD had provided to GAO, but did not include in its report. Indeed, our assessment was that DOD has more comprehensive information than what was provided in its report, and we continue to believe that DOD could have better reflected its current regional missile defense efforts and activities by including this information. Regarding our assessment of acquisition risks for EPAA, MDA provided two sets of technical comments in November on our briefing. However, neither these, nor DOD's technical comments were accompanied by supporting or clarifying documentation. Specifically, we found several suggested changes to be unsupported—and in some cases contradicted –by documentation MDA had already provided. For example, in its comments DOD states that the Command, Control, Battle Management, and Communications element is on track to provide planned EPAA capability. However, the systems engineering, program execution, and budget request documentation we reviewed clearly show a reduction over time in the capability expected for delivery to support the next two EPAA phases as compared to initial plans. In its comments, DOD also characterizes ground test plans as streamlined. Indeed, we found that ground test events were taken out or their content reduced as compared to prior plans, which decreased the ability to gather key information on integrated capability performance. DOD further noted in its comments that modeling and simulation has matured relative to verification, validation, and accreditation of the element models through fiscal year 2013. We agree that MDA has made progress, though again, we found it has decreased planned events and activities in comparison with previous plans, placing DOD at risk of delivering systems without fully understanding their integrated performance.

DOD also noted in its comments that GAO might not have all the data pertaining to certain aspects of system development for EPAA. We believe we requested and received sufficient and relevant data. In 2010, we found that MDA had aligned systems engineering and testing plans with EPAA policy commitments to certain phases by certain dates, noting these were positive acquisition management practices. Specifically, in 2010 we identified MDA's Master Integration Plan (MIP)—the systems engineering plan for the integrated Ballistic Missile Defense System—and MDA's Integrated Master Test Plan (IMTP) as evidence of MDA's positive efforts. We currently find that it has been challenging for MDA to execute those plans and they have changed over time. The documentation we used to make this comparison is the same documentation we identified in our prior work as demonstrating MDA's proactive management; both the MIP and IMTP are produced at least annually, and both documents have been organized around deliveries for EPAA phases since 2010. To show changes over time in acquisition of specific elements participating in EPAA, like Command, Control, Battle Management, and Communications, we supplemented that analysis with reviews of MDA's program execution documentation presented to MDA senior leadership. MDA and DOD officials verified that these documents were authoritative for our comparisons and that we had the most current versions. If there is other relevant data, DOD did not provide it during the course of our review, at the exit meeting to discuss key facts, or in response to our draft report.

In its comments, DOD reiterated its commitment to delivering required functionality for EPAA as planned and in accordance with the phases and dates outlined in the EPAA policy. Our report focused on the changes in MDA's plans for the content and timing of capability to be delivered and we found that capability delivery is delayed as compared to MDA's original plans. We made no determination as to the sufficiency of these capabilities to implement the EPAA policy. In our first report on EPAA, we found that the EPAA policy committed DOD to a schedule before the scope of system development was fully understood. In 2010, MDA identified a single capability increment for delivery in 2015 to align with EPAA Phase 2 and another capability increment for delivery in 2018 to align with EPAA Phase 3. This plan held until development delays led MDA to divide those capability deliveries into at least two increments per phase. DOD further stated that delivery of upgrades will not negatively affect the ability of each element to remain fully operational. However, defensive capability planned for EPAA increasingly depends on integrated performance of the participating elements, or systems. Given the development delays as compared to previous plans, the integration of systems is on a higher risk path. Reduced time between key events results in fewer opportunities to find and fix issues, increasing the risk of performance shortfalls and cost increases or additional delays.

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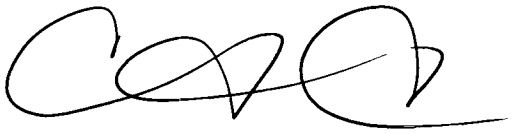
We are sending copies of this report to the appropriate congressional committees and to the Secretary of Defense. The report is also available at no charge on the GAO website at http://www.gao.gov.

If you or your staff have any questions about this report, please contact Cristina Chaplain at 202-512-4841 or ChaplainC@gao.gov or John H. Pendleton at (202) 512-3489 or PendletonJ@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. In addition to the contacts named above, David B. Best and Patricia Lentini, Assistant Directors, as well as Wiktor J. Niewiadomski, Jennifer Spence, Brian T. Smith, and Gwyneth B. Woolwine made key contributions to this report. Also contributing to this report were Susan C. Ditto, Karen Richey, Robert Swierczek, Jay Tallon, and Alyssa Weir.



Cristina Chaplain, Director, Acquisition and Sourcing Management

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Enclosures - 2

List of Addressees

The Honorable Carl Levin
Chairman
The Honorable James Inhofe
Ranking Member
Committee on Armed Services
United States Senate

The Honorable Richard Durbin
Chairman
The Honorable Thad Cochran
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable Howard P. "Buck" McKeon
Chairman
The Honorable Adam Smith
Ranking Member
Committee on Armed Services
House of Representatives

The Honorable Rodney Frelinghuysen
Chairman
The Honorable Pete Visclosky
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

The Honorable Michael R. Turner
House of Representatives

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Regional Ballistic Missile Defense

DOD Report to Congress Addresses Mandate Topics at a High Level and MDA Faces Challenges Synchronizing Development for Europe

Prepared for Congressional Defense Committees

December 16, 2013

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Overview

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- Objective 2: Acquisition for Regional Ballistic Missile Defense of Europe
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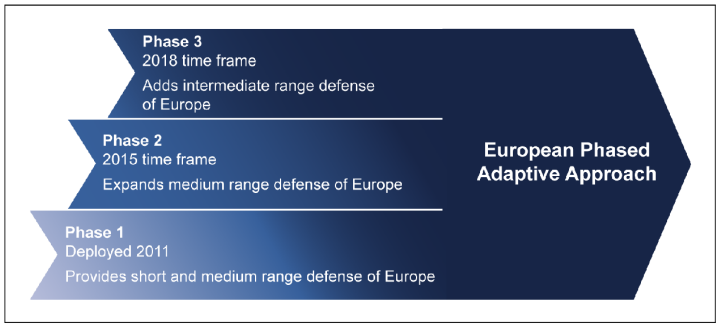
Introduction: EPAA and Regional BMD

European Phased Adaptive Approach:

In September 2009, the President announced a new policy for missile defense in Europe, called the European Phased Adaptive Approach (EPAA). This is a phased effort designed to rely on increasingly capable missiles, sensors, and command and control systems to defend Europe and the United States.*

Figure 1: Policy Timeframes and Defensive Capabilities for EPAA



Source: GAO analysis of President's September 17, 2009, policy announcement, Secretary of Defense briefing on Missile Defense on March 15, 2013, and MDA and DOD data.

Regional Phased Adaptive Approaches: In February 2010, DOD's Ballistic Missile Defense Review introduced a broader policy of regional ballistic missile defense that uses unique phased adaptive approaches (PAAs), including EPAA.

In November 2010, the North Atlantic Treaty Organization (NATO) welcomed EPAA as the U.S. contribution to the NATO missile defense architecture.

*In March 2013, the Secretary of Defense canceled Phase 4, which was expected to add U.S. homeland defense and expanded regional defense in the 2020 timeframe.

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National Defense Authorization Act FY 2013 Section 229 DOD Report on Regional Ballistic Missile Defense

The National Defense Authorization Act (NDAA) for Fiscal Year 2013, section 229[1], required the Secretary of Defense to submit to the congressional defense committees a report describing the status and progress of regional missile defense programs and efforts, and required DOD to include certain topics:

Part A	Part B	Part C	Part D	Part E
An assessment of the adequacy of the existing and planned European Phased Adaptive Approach to provide force protection for forward-deployed forces of the United States in Europe against ballistic missile threats from Iran, and an assessment whether adequate force protection would be available absent the European Phased Adaptive Approach, given current and planned Patriot, Terminal High Altitude Area Defense, and Aegis ballistic missile defense capability.	*A description of the progress made in the development and testing of elements of systems intended for deployment in Phases 2 through 4 of the European Phased Adaptive Approach, and an assessment of technical and schedule risks.*	*A description of the missile defense priorities and capability needs of the regional combatant commands, and the planned regional missile defense architectures derived from those capability needs and priorities.*	*A description of the global force management process used to evaluate the missile defense capability needs of the regional combatant commands and to determine the resource allocation and deployment outcomes among such commands.*	*A description of the missile defense command and control concepts and arrangements in place for United States and allied regional missile defense forces, and the missile defense partnerships and burden-sharing arrangements in place between the United States and its allies and partners.*

[1]Pub. L. No. 112-239, § 229(b) required that DOD's report be in an unclassified form, but noted that it could include a classified annex .

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Objectives

The Act further requires the Comptroller General to brief the congressional defense committees on his views on DOD's report. Our specific objectives are:

1. To what extent did DOD's Regional Ballistic Missile Defense Report address the topics in Section 229?

2. What acquisition risks, if any, could affect the planned delivery of capability for the U.S. ballistic missile defense of Europe?

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Scope and Methodology

To assess the extent to which DOD's report addressed the section 229 topics, we reviewed the DOD report and compared it to section 229 of the NDAA for FY 2013; we also compared DOD's report to information gathered about regional ballistic missile defense efforts as part of an ongoing review of EPAA. We also met with DOD officials to discuss the methodology and review materials used to prepare the report and met with other DOD officials to discuss their input. We focused our review on the form and substance of the material in DOD's report and did not assess its compliance with the law.

To assess what acquisition risks, if any, could affect planned capability deliveries, we reviewed the President's policy for missile defense of Europe (EPAA), DOD directives related to missile defense, MDA acquisition directives and instructions, MDA Master Integration Plans, Integrated Master Test Plans, Integrated Master Assessment Plans, and Program Execution and Baseline Execution Reviews. We also met with MDA and DOD officials to corroborate key acquisition information.

We conducted this performance audit from October 2012 to December 2013 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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Summary of Findings

1. DOD's report contained information pertaining to all five topics, generally describing plans and processes for regional missile defense. However, for four topics, DOD has more comprehensive information which it could have provided to better reflect its current efforts and activities. For the topic on progress in system development and testing and assessment of technical and schedule risk, based on our body of work, the report's characterization that technical and schedule risks are minimized is optimistic. We present our assessment of acquisition risks in our second objective. GAO believes additional details may have assisted Congress as it oversees these investments.

2. Since our first review of EPAA in 2010, DOD has progressed in establishing some acquisition management practices for EPAA and it has delivered some capabilities. However, it faces three acquisition challenges to executing its approach: (1) acquisition management to synchronize development for EPAA; (2) executing development and integration; and (3) executing testing and assessment. As a result, although the dates MDA plans to declare technical capability for EPAA have not changed, the capability to be delivered and the understanding of its performance is more limited than initially planned.

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Background: Key Terms

Term	Description
Ballistic Missile Defense System (BMDS)	Designed to counter ballistic missiles of all ranges. Since ballistic missiles also have different speeds, size and performance characteristics, the BMDS is to be an integrated, "layered" architecture that provides multiple opportunities to destroy missiles and their warheads before they can reach their targets.
Intercept	Engagement of a ballistic missile using either the force of a direct collision, or an explosive blast fragmentation warhead
Short-range ballistic missile	Threat missile with range of less than 621 miles, to be defended against by capabilities in Phase 1 of EPAA.
Medium-range ballistic missile	Threat missile with range from 621 to1,864 miles, to be defended against by capabilities in Phases 1 and 2 of EPAA
Intermediate-range ballistic missile	Threat missile with a range from 1,864 to 3,418 miles, to be defended against by capabilities in Phase 3 of EPAA
Raid	An attack by multiple ballistic missiles
System track	Created by data from different land, sea, and space based multiple sensors, a single track of a threat missile is used to provide cues to BMDS radars and enable interceptor quality fire control.
Battle management	Combining the best sensors and shooters to ensure the highest probability of kill
Debris	Objects, which—if present during an engagement—may pose a challenge to identification or tracking of a threat missile, or confirmation of intercept.
Discrimination	Ability to determine whether an object is a threat or non-lethal; to identify object details to determine the target from debris or decoys.

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Background: Systems that May Contribute to Regional Ballistic Missile Defense

System	Description
Command, Control, Battle Management, and Communications (C2BMC)	A network that integrates individual missile defense elements and allows users to plan ballistic missile defense operations, see the battle develop, and to manage networked sensors and weapon systems. Currently a C2BMC suite is operating in Europe in support of EPAA.
BMDS Sensors	MDA has a variety of sensors that support various parts of the BMDS including the Army Navy/Transportable Radar Surveillance and Control Model 2 (AN/TPY-2) radar. The AN/TPY-2 may operate on its own (forward-based mode) or with a THAAD battery (terminal mode). Currently a AN/TPY-2 radar is operating in Turkey in support of EPAA.
Aegis Ballistic Missile Defense (BMD) with Standard Missile-3	Aegis BMD is a sea-based system developed for ballistic missile defense and other missions. MDA is developing several versions of SM-3 and associated ship-based software and processors. Some Aegis BMD ships are currently assigned to Europe in support of EPAA.
Aegis Ashore	A land-based, or ashore, version of Aegis BMD. Initially it will use SM-3 Block IB missiles, with plans to use various versions of SM-3 missiles and Aegis weapon system software as they become available. Aegis Ashore is planned for installation in Romania and Poland in support of EPAA.
Aegis Standard Missile 3 (SM-3)	Defensive missile that intercepts threat missiles of various ranges. Block IA is fielded; Block IB is expected to better identify, discriminate, and track objects during flight. Block IIA is to be larger than IB and to have increased velocity, range, and discrimination capabilities. Aegis BMD ships in Europe have the Block IA; each variant is expected to support EPAA.
Terminal High Altitude Area Defense (THAAD)	A mobile, ground-based missile defense system organized as a battery which includes interceptors, launchers, an AN/TPY-2 radar, a fire control and communications system, and other support equipment. THAAD may be used for EPAA and in other regional approaches.

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Background: Prior GAO Work

We have issued several reports on development and implementation of ballistic missile defense capabilities for EPAA :

- In our first assessment of EPAA acquisitions in 2010 we found that DOD had not fully implemented a management process that synchronizes EPAA acquisition activities and ensures transparency and accountability.
- In 2011 we recommended that DOD establish an integrated schedule and develop life-cycle cost estimates for EPAA.
- In 2012 we made 4 recommendations to reduce concurrency—broadly defined as the overlap between technology development and product development, or between product development and production—and to strengthen MDA's acquisitions supporting EPAA. Specifically, we recommended that DOD assess the extent to which the dates announced by the President in 2009 are contributing to concurrency and recommend schedule adjustments where significant benefits can be obtained.
- In 2013 we found that, although DOD reported implementation of Phase 1 of EPAA in December 2011, MDA was resolving some issues to provide the full capability and was facing delays to some systems.

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Objective 1

To what extent did DOD's Regional Ballistic Missile Defense Report address the topics in Section 229?

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Objective 1
Part A: Adequacy of Force Protection

What DOD Reported

EPAA allows the U.S. and NATO allies to address the ballistic missile threat from Iran by first providing protection to the parts of Europe that are most vulnerable to the existing and near-term threat.

The U.S. continues to work in close collaboration with NATO allies to protect allied territory along with U.S. installations, service personnel and their families. Protection would not be available without the EPAA and the growth inherent in the EPAA implementation plan.

GAO Views

In response to the mandate, DOD provided a general assessment that EPAA allows for the protection of Europe. However, DOD's report did not include details on the adequacy of protection that EPAA provides, including:

•any potential limitations to that protection, or why other planned systems would not provide adequate protection absent EPAA; and

•relevant information on assumptions that could affect DOD's ability to execute missile defense operations, such as the availability of BMD assets or coordination between combatant commands.

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Objective 1
Part B: Progress in System Development and Testing, Assessment of Technical and Schedule Risk

What DOD Reported

There is considerable progress in development and testing of systems intended for EPAA, and that as a result technical and schedule risks have been minimized.

Successful test records of interceptor systems and low technical risk.

GAO Views

Description of progress in development and testing in DOD's report is uneven; limited detail for some systems (e.g. C2BMC) vs. more detail for others. DOD's report does not discuss:

•integration challenges inherent in developing individual systems dependent on each other to deliver integrated regional ballistic missile defense capabilities for EPAA phases;

•test anomalies, failures, or limitations

•assessments of progress in development and testing and assessment of schedule and technical risk conducted by the Director, Operational Test and Evaluation

•the extent to which assessments of integrated system performance have been conducted for EPAA phases

Slides 17-28 and Appendix 1 provide a current assessment of acquisition risks

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Objective 1
Part C: Description of Regional Priorities and Capability Needs

What DOD Reported

In Europe, DOD bases its planning for BMD on EPAA and is moving forward with plans to deploy BMD forces in support of EPAA in three phases.

In the Asia-Pacific, DOD is pursuing an adaptive and evolutionary approach. DOD supports BMD while taking into account partners' priorities, capability requirements, and security concerns. DOD also listed several key factors for BMD.

In the Middle East, DOD continues to support work on BMD adaptive and evolutionary approaches while taking into account regional partners' priorities and capability needs. DOD also briefly identified the BMD challenge within the region.

GAO Views

DOD responded to the mandated description of regional missile defense priorities and plans by providing broad information on approaches and existing and planned capabilities in Europe, the Asia-Pacific, and the Middle East. Regional combatant commands were consulted but the report did not provide details on relevant information DOD has, including:

•detail on each regional combatant commands' stated missile defense priorities and capability needs; and

•detail on missile defense architectures, such as types and quantities of assets, planned for each combatant command, and how those plans respond to stated regional priorities and capability needs.

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Objective 1
Part D: Description of Global Force Management

What DOD Reported

DOD relies on the global force management process to assist in decisions on the worldwide allocation of missile defense systems. Specifically, it has supported annual allocation of rotational BMD forces to U.S. Central Command, U.S. Pacific Command, and U.S. European Command as well as the emergent allocation and rapid deployment of BMD elements to these regions.

DOD considers guidance from the Secretary of Defense on mission priorities, Intelligence Community threat assessments, military service support, and Combatant Commander risk assessments when determining the allocation of scarce BMD resources.

GAO Views

DOD's report provided general information on the global force management process to address the mandate, but did not provide details from existing information, including:

•identification of steps in the process and aspects specific to missile defense, such as U.S. Strategic Command's role in force management recommendations;

•reference to specific DOD documents important to global force management, such as the Global Force Management Implementation Guidance and the Guidance for Employment of the Force; and

•discussion of other aspects of global force management, including assignment and apportionment, which influence how regional combatant commands plan for missile defense.

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Objective 1
Part E: Description of Partner Cooperation and Coordination

What DOD Reported

DOD listed some allied and partner missile defense capabilities and contributions, and also described its emphasis on bilateral cooperation in the Asia-Pacific and Middle East, and multilateral cooperation and command and control with NATO in Europe.

In addition, DOD described the system it uses for command and control. Specifically, Combatant Commanders are developing the means by which they can also command and control BMD forces. The BMD capability that allows Combatant Commanders to network, integrate, and synchronize missile defenses is the C2BMC global network.

GAO Views

In order to describe missile defense partnerships and arrangements, DOD provided information on allied and partner contributions. However, DOD focused its description of command and control in the report on its global network and did not provide additional details on relevant information it does have, including:

•the command and control structures and procedures that are typically developed within alliances, such as transfer of operational authority or integration of staff;

•how regional combatant commanders will integrate missile defense operations across areas of responsibility; and

•technical limitations of the C2BMC.

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Objective 2

What acquisition risks, if any, could affect the planned delivery of capability for the U.S. ballistic missile defense of Europe?

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Objective 2
Challenges Executing Acquisition Approach for EPAA

As EPAA's successive phases are expected to defend larger areas, against more numerous and more capable threat missiles, defensive capability increasingly depends on integrated performance of the participating systems.

DOD's assessment that technical and schedule risks have been minimized is optimistic. Updating our body of work, MDA faces three key challenges in executing its acquisition approach for EPAA:

1. Acquisition Management: Although it has made progress since 2010, DOD has not fully implemented a management process that synchronizes acquisition activities and ensures transparency and accountability of its investment in EPAA.
2. Development and Integration: Development has become fragmented, delaying delivery of some capabilities previously associated with each EPAA phase, and increasing risk. Concurrency in development, testing, and production of certain systems poses risks to planned implementation of EPAA Phases 2 and 3.
3. Testing and Assessment: Testing is occurring later than planned and is less robust; development of assessment tools continues but MDA has not been able to conduct EPAA phase Performance Assessments, which significantly limits understanding of expected performance as compared to initial plans.

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Objective 2
DOD's Management Approach for EPAA

- Implementation of the EPAA policy requires significant acquisition effort, cost, and synchronization of multiple programs.
- According to DOD, the approach is meant to be flexible and cost-effective, with the specific components of the phases adapted to changing threats and developing capabilities.
- Since 2010, DOD has continued to emphasize the benefits of a policy of regional phased adaptive approaches, saying that it does not require a globally integrated missile defense architecture and that it relies on proven solutions.
- According to DOD, because EPAA is a policy, not a separate missile defense acquisition program, DOD is using the department's existing processes for managing missile defense acquisitions and MDA's existing approach for acquiring missile defense programs—not one specific to EPAA.
- In line with DOD's existing approach for managing missile defense acquisitions, MDA has responsibility to develop the systems. MDA makes Technical Capability Declarations for the individual systems. This process has been modified for EPAA; MDA also makes a Technical Capability Declaration for each EPAA phase. Additionally, U.S. Strategic Command works with the services and regional combatant commands—such as U.S. European Command—to determine whether to accept the capability for operational use.

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Objective 2
Challenge: Acquisition Management Practices

In our first report in 2010 on EPAA we assessed progress of EPAA acquisition planning against six key acquisition principles. Although it has made progress, DOD has not yet fully implemented a management process that synchronizes EPAA acquisition activities and ensures transparency and accountability.

Practice[a]	2010	2013
Stakeholders and decision makers identified and roles defined	Ongoing	Present
Integrated planning for technology development and systems engineering	Present	Present with improvements
Integrated testing	Present	Present with improvements
Well defined requirements	Ongoing	Ongoing
Integrated investment view	Not present	Not present
Integrated schedule and decision reviews	Not present	Not present

[a] *Status key: Not Present: tasks related to establishing the practice have not started; Ongoing: tasks related to establishing the practice are started; Present: tasks related to establishing the practice are completed*

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Objective 2
Challenge: Acquisition Management Practices

Since 2010 DOD has made progress in three areas:

- *Defined Stakeholders and Roles: Present*. In 2012 DOD issued a directive updating the Warfighter role in testing and capability acceptance to align with EPAA.
- *Integrated Planning for Systems Engineering* and *Integrated Testing*: *Present with Improvements*. DOD has added detail and clarity to its planning.

Our 2010 assessment did not change in three other areas:

- *Well-defined Requirements: Ongoing*. DOD continues to refine planned architectures, systems, and quantities for Phase 3.
- *Integrated Investment View*: *Not Present*. In 2011 DOD received a congressional request to develop an independent cost estimate for EPAA. DOD's Office of Cost Assessment and Program Evaluation prepared an estimate in 2012 and submitted it to the Office of the Secretary of Defense. We could not determine whether it was ever submitted to the congressional requestor.
- *Integrated Schedule and Decision Reviews*: *Not Present*. Although in 2010 MDA indicated plans to develop one, acquisitions are not being formally managed through an EPAA Integrated Master Schedule. MDA has periodically generated a high level BMDS schedule for decision-makers, most recently in November 2012. It remains unclear how acquisition programming is formally aligned to deliver and what constitutes success in delivering EPAA capabilities.

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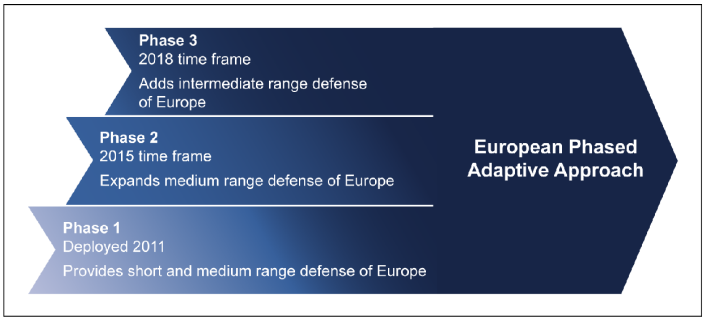
Objective 2
Challenge: Executing Development and Integration

While MDA Technical Capability Declaration dates for EPAA phases have remained unchanged since 2010, some capabilities will be delivered later than originally anticipated.

Current Plans:

- Phase 3: Some capabilities previously planned for delivery by 2018 are now expected by 2020 or later
- Phase 2: Some capabilities previously planned for delivery by 2015 are now expected by 2017
- Phase 1: Some capabilities planned to complete Phase 1 in 2014, are now expected by 2015

Figure 2: Policy Timeframes and Defensive Capabilities for EPAA



Source: GAO analysis of President's September 17, 2009, policy announcement, Secretary of Defense briefing on Missile Defense on March 15, 2013, and MDA and DOD data.

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Objective 2
Challenge: Executing Development and Integration Phase 1

- President's 2009 EPAA policy: By 2011, limited defense against short- and medium-range ballistic missiles using existing systems that could be quickly deployed
- Original Goal - MDA 2010 Master Integration Plan: MDA plans its development and integration of BMDS capabilities in its Master Integration Plan and the 2010 plan was the first to address EPAA. This plan identified that some capability would be delivered by 2011 and upgrades by 2014.
- Current status:
  - MDA declared EPAA Phase 1 technical capability to defend against short-range ballistic missiles in December 2011 with delivery of an AN/TPY-2 radar, an Aegis BMD ship with SM-3 Block IA missiles, an upgrade to C2BMC, and the existing space-based sensors.
  - Phase 1 upgrades to augment defense against short-range ballistic missiles will not be delivered until 2015 due in part to addressing limitations identified following Phase 1 declaration.

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Objective 2
Challenge: Executing Development and Integration Phases 2 and 3

Delivery of some capabilities originally anticipated for Phase 2 and 3 are delayed; reduced time between key events and concurrency result in fewer opportunities to find and fix issues, increasing risk of performance shortfalls and cost increases or additional delays. Appendix I assesses individual systems contributing to EPAA.

PHASE 2	PHASE 3
Capability Expected and Integration Plan	
2009 EPAA policy: by 2015 timeframe increased capability against medium-range ballistic missiles. 2010 Original goal – MDA Plans: develop a single set of integrated capability, with improved interoperability between remote sensors and interceptor systems, increasing the defended area and capabilities against larger raid sizes for delivery in 2015 aligned with EPAA policy.	2009 EPAA policy: by 2018 timeframe improve performance to include capability against intermediate-range ballistic missiles. 2010 Original goal – MDA Plans: develop a single set of integrated capability, with improvements in interoperability and raid handling capabilities against larger raids and wider range of threats, projected for delivery in 2018 aligned with EPAA policy.
Development Status and Risks	
MDA split the development into two pieces, what it calls a "core" or "basic" capability to be declared in 2015 and an upgrade in 2017. Integration for some systems in 2015 is on a higher risk path than originally planned: activities initially expected to be sequential are now concurrent, and an event designed to reduce integration and testing risk was eliminated.	In 2013 MDA realigned what capability it planned to deliver, designating only a subset of the original capability as "core" or "basic" for Phase 3. The remaining capability is planned for delivery in 2020 or later; it is unclear whether that delivery is associated with EPAA. Some participating systems are too early in development to assess risks. Development schedules for some systems are concurrent with Phase 3 integration activities.

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Objective 2
Challenge: Executing Testing and Assessments

- While our work in 2010 found a testing and assessment approach was in place for EPAA, and there has since been progress, MDA has struggled to execute its testing and assessment approach for EPAA.
  - Testing: MDA continues to experience cancellations and delays.
  - Modeling and Simulation Tools: MDA continues to struggle to develop the tools needed to successfully assess regional missile defense performance.
  - Performance Assessments: MDA has not been able to conduct EPAA phase Performance Assessments—formal system-level end-to-end simulations—as planned.
- As a result, MDA faces making Technical Capability Declarations without the testing and assessment information it planned to have.

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Objective 2
Challenge: Executing Testing and Assessments Testing Instability

- Continued testing cancellations and delays, due in part to availability of targets have:
  - Reduced opportunities to collect data to understand performance; and
  - Reduced ground tests, increasing risks to those tests and reducing the information previously expected to be available to support phase Technical Capability Declarations.
- MDA is relying on the addition of dedicated, short-term testing events to mitigate the effects of cancelled and delayed ground tests. However, testing officials are concerned that doing so could result in having less understanding of system interoperability to inform MDA's Technical Capability Declaration, and we believe this may cause further disruptions to the ground test plan.

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Objective 2
Challenge: Executing Testing and Assessments Modeling and Simulation Tools

- Models and simulations are critical to understanding operational performance because assessing performance through flight tests alone is prohibitively expensive and can be affected by safety and test range constraints. Models and simulations can be much less costly and are inherently not subject to the same safety and test range constraints.
- GAO has previously found, most recently in April 2013, that MDA continues to struggle to develop the tools—both the models and the modeling and simulation testing architecture—needed to successfully assess regional ballistic missile defense performance.
- Models: Although MDA has been able to improve its Modeling and Simulations program, it remains unclear whether models will be mature enough to realistically represent performance in time for the Phase 2 assessment. In testimony before the Senate Armed Services Committee in May 2013, the Director of MDA acknowledged the need to improve the models.
- Architecture: MDA is developing a new architecture; however, it will not be available for Phase 2 assessment. Although it is expected to be available for a Phase 3 assessment, testing and assessment officials are concerned that tight timeframes and technical complexity mean that any disruptions could delay its availability beyond Phase 3.

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Objective 2
Challenge: Executing Testing and Assessments Performance Assessments

- MDA had planned to conduct Performance Assessments—a formal system-level end-to-end simulation—for each EPAA phase, to help inform the technical capability declaration.
- When MDA declared the first phase of U.S. missile defense in Europe technically capable in December 2011 it did so without the planned data from a Phase 1 Performance Assessment. The assessment was conducted but the data were not reliable.
- MDA cancelled plans to conduct a Phase 2 Performance Assessment in late 2012 because of continued concerns with data reliability. MDA redirected funds planned for the Performance Assessment to development of its new modeling and simulations testing architecture.
- MDA officials acknowledged the risk of not conducting Performance Assessments for EPAA Phases 1 and 2—a reduced understanding of system-level performance. However, they believe increasing risk in the short-term is necessary in order to increase confidence in the BMDS long-term. MDA is using data from several ground tests to support a Phase 2 technical capability declaration similarly to how they supported the declaration for Phase 1.

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Concluding Observations

- While DOD's Regional Ballistic Missile Defense report provides general information on each of the mandated topics, additional details may have benefitted the congressional defense committees during their authorization and appropriation deliberations.
- The development and delivery of increasingly capable and integrated missile defense capabilities in Europe is a complex and challenging acquisition effort. MDA plans to declare the next two phases technically capable in 2015 and 2018 although development and testing challenges have led MDA to delay delivery of some capabilities as compared to initial plans, making them available as upgrades/enhancements after Technical Capability Declaration. This approach allows flexibility, but at the risk of delivering less capability than expected and not being able to determine the actual performance of the fielded capability.

Summary of DOD's Comments

DOD provided comments, which we incorporated where appropriate.

- In response to GAO's first finding, DOD officials emphasized that they have efforts ongoing in some of the areas GAO cited as lacking details, but they did not discuss those efforts in the report. We added language to clarify that our finding is focused on the content of DOD's report.
- In response to GAO's second finding, DOD officials expressed some concerns. First, that there was not sufficient recognition of EPAA as a policy, vs. an acquisition program. In addition, they felt it was unclear that MDA currently plans to make Technical Capability Declaration for EPAA phases 2 and 3—to contain what they termed 'core', or 'basic' capability for those phases—in alignment with EPAA policy dates of 2015 and 2018, and to deliver 'upgrades' or 'enhancements', or 'supplemental capability' later. Finally, they were concerned that challenges cited to testing and assessment did not sufficiently acknowledge the value of testing and assessments that were, and are planned to be, conducted in support of Technical Capability Declarations. We added clarifying language in each of these areas.

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Appendix I

Summary of Individual System Acquisition Risks

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Command, Control, Battle Management & Communications (C2BMC)

C2BMC integrates individual missile defense systems. It allows users to plan ballistic missile defense operations, see the battle develop, and manage networked sensors and weapon systems. Software version 6.4 was fielded in 2011 for Phase 1, and includes some capability to launch an interceptor based on data from another sensor.

PHASE 2	PHASE 3
Expected Capability Improvements	
In 2010 MDA associated software version 8.2 with Phase 2 and planned it for delivery in 2015. It is to provide a better integrated view of threat missile tracks from different sensors. It improves the quality of track data that enables Aegis BMD to launch an interceptor while waiting for its own sensor to identify and track the threat missile.	In 2010 MDA associated software version 8.4 with Phase 3 and planned to deliver it in 2018. It is to provide an integrated track sooner, more precisely, and under more complex conditions. It further improves the quality of track data, and enables Aegis BMD to directly engage/intercept a threat missile, without using its own sensor.
Development Status and Risks	
Software version 8.2, with better sensor management and better quality track data that improves the capability to launch an interceptor using other sensors, will not be available until 2017.	In 2013 MDA restructured the development, delaying version 8.4 that provides more complex sensor and battle management capability until 2020 or later. It is unclear whether MDA still considers this capability part of EPAA. MDA added software version 8.2x with some capability to engage a threat missile using another sensor by 2018.

Some delays in capability planned for Phases 2 and 3 have ripple effect on other BMDS systems; integration is a key feature—and also a risk.

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Army Navy/Transportable Radar Surveillance and Control Model 2 (AN/TPY-2)

The AN/TPY-2 tracks ballistic missiles in two modes;"forward based"—on its own, and "terminal"—co-located as part of a THAAD battery. In forward-based mode it is integrated into the BMDS through C2BMC, which tasks sensors and receives sensor data to form a "track", then forwarded to Aegis BMD in the European theater. The AN/TPY-2 was fielded in Turkey in 2011 for Phase 1, where it operates in forward-based mode.

PHASE 2	PHASE 3
Expected Capability Improvements	
New radar software is expected to improve integrated BMDS system performance for Phase 2 through interoperability with C2BMC and space-based early warning sensors, as well as improving identification of a threat missile among debris.	New radar software is expected to improve integrated BMDS system performance for Phase 3 through interoperability with C2BMC and with SM-3 interceptors when they use AN/TPY-2 radar tracks.
Development Status and Risks	
Software for Phase 2 expected to be available, but C2BMC delays may postpone full implementation of integrated capabilities.	Improvements to AN/TPY-2 planned for Phase 3 are expected to be ready after risk reduction integration starts, instead of before. This compresses the remaining time for integration and testing, resulting in fewer opportunities to find and fix issues before delivery.

Key capabilities for Phase 1 will not be fully available until 2015. Full benefit of radar's contribution to integrated capability for Phase 2 is likely to be delayed, due to dependence on delayed C2BMC software, while integration of capability for Phase 3 is not aligned with the development of new radar software.

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Aegis Ballistic Missile Defense (Aegis BMD)

Aegis BMD is a sea-based system developed for ballistic missile defense and other missions. First Generation Aegis BMD was deployed to Europe in 2011 in support of Phase 1.

PHASE 2	PHASE 3
Expected Capability Improvements	
Initial version of Second Generation Aegis BMD improves discrimination, target classification and provides initial ability to launch an interceptor using a remote sensor. An upgrade was added to increase types of threats that can be engaged and is expected for delivery by 2015 .	Third Generation Aegis weapons system expected to enable intercept based on external sensor data and improve discrimination capability of the ship's radar.
Development Status and Risks	
In addition to its own development delays, the upgrade is currently tied to a broader Navy Aegis Weapon System modernization efforts. As a result, any delays or development challenges in those other efforts would also affect this planned upgrade.	Currently appears on track for Phase 3. However, full benefit may not be achieved initially due to C2BMC delay discussed earlier

Development of the upgrades for delivery in support of Phase 2 has become increasingly complex. Further, C2BMC delays affect integrated system performance previously expected in Phases 2 and 3.

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Aegis Ashore

MDA is currently building a land-based, or ashore, version of Aegis BMD that is expected to use increasingly capable versions of Aegis weapon system software as they become available. Aegis Ashore is to be installed for operation in Romania and Poland for EPAA; no additional locations are planned.

PHASE 2	PHASE 3
Expected Capability Improvements	
Features upgraded Aegis BMD weapons system that enables engagement of threats projected for Phase 2.	Features additional upgrades to Aegis weapons system to enable intercepts based on tracks from remote sensors.
Development Status and Risks	
Aegis Ashore to be installed in Romania by 2015 with an interim version of the weapon system software; the final version is planned for delivery as part of an upgrade in 2017. MDA plans to produce the deckhouse before flight testing can demonstrate it works with the upgraded weapon system and interceptors as intended.	The program plans to begin production of the deckhouse for Poland before flight tests can validate the design.

A highly concurrent schedule for Aegis Ashore installations and Aegis weapon system development mean issues discovered during testing could require fixes, possibly after operational deployment. DOD believes concurrency risk is properly balanced with development and production activities, noting that flight testing will not affect technical design.

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Aegis Standard Missile-3 (SM-3)

DOD is developing increasingly capable versions of the SM-3 interceptor to be used on land-based and sea-based Aegis platforms. SM-3 Block IB and SM-3 Block IIA are planned to support Phases 2 and 3 respectively. The Block IA was fielded in support of Phase 1.

PHASE 2	PHASE 3
Expected Capability Improvements	
SM-3 Block IB features additional capabilities over the Block IA to identify, discriminate, and track objects during flight. MDA plans to produce at least 48 missiles to meet the Phase 2 needs.	The Block IIA is expected to be larger and to have increased velocity, range, better maneuverability and discrimination capabilities.
Development Status and Risks	
MDA appears to have resolved previous development issues with a key component that disrupted the production of SM-3 Block IB missiles. However, an anomaly was observed in a recent test for this same component and a failure review is ongoing. Potential effects on production are unclear.	Current development appears to be on track for Phase 3 deployment.

Annual production quantities for Block IB are planned to significantly increase to meet Phase 2 capability needed in 2015.

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Terminal High Altitude Area Defense (THAAD)

THAAD may be used for EPAA and in other regional approaches. It is a mobile, ground-based missile defense system organized as a battery which includes interceptors, launchers, an AN/TPY-2 radar (in terminal mode), a fire control and communications system, and other support equipment. It is already in production, but the program is also developing improvements.

PHASE 2	PHASE 3
Expected Capability Improvements	
A new version of THAAD was expected to be available with improved performance in debris environments.	A new version of the THAAD is expected to be available in 2018, featuring better coordination with other BMD systems and the ability to launch on a C2BMC generated system track.
Development Status and Risks	
MDA has developed and implemented part of the debris mitigation. However, the software version needed to complete this capability will not be available for integration testing until 2017.	Software improvements are planned to be available for integration testing after testing for Phase 3 has already begun. This will increase risk because there will be reduced time to find and fix software deficiencies or integration issues, if any are discovered.

Key THAAD capabilities are currently delayed to 2017, while the schedule to integrate THAAD with other systems in Phase 3 is compressed.

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Enclosure II: Comments from the Department of Defense

ASSISTANT SECRETARY OF DEFENSE
30150 DEFENSE PENTAGON
WASHINGTON, DC 20301-3015

ACQUISITION

Ms. Cristina Chaplain
Director, Acquisition and Sourcing Management
U. S. Government Accountability Office
441 G Street, N.W.
Washington, DC 20548

022414

Dear Ms. Chaplain:

This is the Department of Defense (DoD) response to the Government Accountability Office (GAO) Draft Report, GAO-14-248R, "REGIONAL MISSILE DEFENSE: DoD's Report Provided Limited Information, Assessment of Acquisition Risks is Optimistic," dated January 14, 2014 (GAO Code 121109).

The Department previously provided technical comments on the Statement of Facts and the draft briefing attached to the report, of which a majority are still applicable, providing further information about the three phases of the European Phased Adaptive Approach (EPAA). The Department is committed to delivering EPAA on schedule as follows:

- Phase I of EPAA was delivered as planned in December 2011 and is fully operational.
- The required functionality for EPAA Phase 2 will be delivered as planned in 2015, with continued supplemental upgrades delivered during the phase.
- The required functionality for EPAA Phase 3 will be delivered as planned in 2018, with continued supplemental upgrades delivered during the phase.

The planned upgrades for elements of the Ballistic Missile Defense System to support evolutionary development are typical for any deployed system. Delivery of these upgrades will not negatively affect the ability of each element to remain fully operational.

It appears that GAO might not have all the data and therefore for clarification, the Command and Control, Battle Management, and Communications element is on track to provide planned EPAA capability; the ground test plans are streamlined, and Modeling and Simulation has matured relative to Verification, Validation, and Accreditation of the elements model through FY 2013, despite continuing resolution and sequestration shortfalls in FY 2013.

In addition to the above comments, the enclosed technical comments clarify or correct content in the draft report.

We appreciate the opportunity to comment on the draft report. My point of contact for this effort is Lt Col Peter Jackson, 703-695-7328, peter.e.jackson.mil@mail.mil.

Sincerely,

Katrina McFarland

Enclosures:
As stated

(121109)